

Application No. 10/699,948
Amendment dated June 13, 2005
Responds to Office Action of December 13, 2004

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of claims:

1. (Currently amended) A hydraulic tensioner for use in a high tensile force environment where space is limited, said tensioner applying tension to a studbolt extending from an article, said tensioner comprising:

5 a puller bar having a threaded end for threaded engagement with a threaded end in an internal thread in an end of the studbolt;

hydraulic means for exerting a pulling force on the puller bar and thus the studbolt to apply tension to the studbolt;

10 a nut assembly for fitment to the studbolt in a position adjacent against the article, said nut assembly comprising a nut body for threaded engagement on said studbolt and having with a downwardly and inwardly substantially conical or tapered peripheral outer surface, and an annular collar or shell with a complementary conical or tapered recess to receive the nut body, in use; and

15 a bridge for extending around and over the nut body, operable to react between the hydraulic means and the article to tension the studbolt by a pulling force exerted by said hydraulic means on said puller bar to pull said end of the studbolt in a direction away from the article, said nut body being adjustable on the studbolt and against the tapered recess in the collar to take up elongation of the studbolt as a result of applying tension to it engageable with the collar or shell; and

20 hydraulic means for acting between the puller bar and bridge and operable to cause the puller bar to tension the studbolt by pulling said end of the studbolt in a direction away from the article.

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2. (Currently amended) A hydraulic tensioner as claimed in Claim 1, and further including:

a puller buddy engageable with ~~an external thread about said threaded end~~ of the studbolt and engageable with the puller bar so that when the puller bar is moved to tension the studbolt,
5 the puller buddy is also moved to tension the studbolt.

3. (Currently amended) A hydraulic tensioner as claimed in Claim 1, wherein:

the threaded end of the studbolt includes an internal thread; and

the internal thread in the studbolt is stepped in diameter and the puller bar has a threaded end with complementary ~~steeped~~ stepped external threads.

4. (Currently amended) A hydraulic tensioner as claimed in Claim 1, wherein:

the threaded end of the studbolt includes an internal thread;

the internal thread in the studbolt is substantially conical or tapered; and

the threaded end of the puller bar has a complementary substantially conical or tapered

5 external thread.

5. (Previously amended) A hydraulic tensioner as claimed in Claim 4 wherein:

the internal thread on the studbolt and the externally threaded end of the puller bar are equally tapered, and the threads comprise buttress threads.

6. (Previously amended) A hydraulic tensioner as claimed in Claim 5 wherein:

the taper of the internal thread on the studbolt and the taper of the externally threaded end of the puller bar are at an angle of approximately 10° to the normal to the horizontal axes of the studbolt and puller bar.

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7. (Original) A hydraulic tensioner as claimed in Claim 6 wherein:
the pitch of the external thread on the puller bar is greater than the pitch of the internal
thread in the studbolt.

8. (Previously amended) A hydraulic tensioner as claimed in Claim 7 wherein:
the pitch of the external thread on the puller bar is 100.1% to 100.5% of the pitch of the
mating thread in the studbolt.

9. (Currently amended) A coupling for an hydraulic tensioner for applying tension
to a studbolt extending from an article and fitted with a nut, wherein said tensioner comprises a
puller bar for engagement with an end of the studbolt, hydraulic means acting between the puller
bar and the article and operable to cause the puller bar to tension the studbolt by pulling said end
5 of the studbolt in a direction away from the article, and a bridge extending around and over the
nut for transmitting reactive force from the hydraulic means to the article, and wherein said
coupling comprises:

an internally threaded bore in an end of the studbolt and a complementary externally
threaded end on the puller bar, said internally threaded bore and said externally threaded end
10 being tapered at an angle of about 10° to a length axis of the studbolt, and said threads being
substantially uniform and constant throughout their length and comprising buttress threads
having a flank or shoulder facing away from the article and substantially perpendicular to the
common axes of the studbolt and puller bar, and a flank or face facing toward the article and
oriented at an angle of about 45° to the length axis of the studbolt.

10. Cancelled

11. (Currently amended) A coupling as claimed in Claim 9 ~~10~~ wherein:
the pitch of the external thread on the puller bar is greater than the pitch of the internal
thread in the studbolt.

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12. (Original) A coupling as claimed in Claim 11 wherein:

the pitch of the external thread on the puller bar is 100.1% to 100.5% of the pitch of the mating thread in the studbolt.

13. (Currently amended) A nut assembly for use with the coupling claimed in claim 9, the nut assembly comprising:

a nut body with a substantially conical or tapered peripheral outer surface;

an annular collar ~~or shell~~ with a complementary conical or tapered recess to receive the

5 nut body, in use; and

the nut body being screwed, in use, on the studbolt into the recess of the annular collar ~~or shell~~.

14. (Currently amended) A nut assembly as claimed in Claim 13 and further including:

a base washer interposed between the annular collar and the article and having a substantially part-spherical face engageable by a complementary part-spherical face on the
5 annular collar or shell to enable the base washer and annular collar or shell to be self-aligning.

15. (Currently amended) A washer for use between the nut assembly and article in the tensioner as claimed in Claim 1, said washer comprising:

a first annular means and second annular means mating at a slip plane angled from ~~a~~ the plane transverse to the axis of the washer; and

5 removable or releasable means holding the first and second annular means against relative slip over the slip plane therebetween while whilst the removable or releasable means is in place.

16. (Currently amended) An hydraulic tensioner for application with a stud bolt extending from an article and fitted with a nut, said tensioner comprising:

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a puller bar having a longitudinal axis and a tapered end tapered at an angle of about 10° to said longitudinal axis, said tapered end having an external thread for engagement in an internal thread in an end of the studbolt, said external and internal threads comprising buttress threads having a shoulder or flank lying substantially perpendicular to the longitudinal axis of the puller bar;

5 a puller buddy having an internally threaded end for engagement with an external thread on said end of the studbolt, and means engageable with the puller bar for exerting a pulling force on the puller buddy when a pulling force is exerted on the puller bar; and

10 an hydraulic means acting between the puller bar and the article via a bridge positioned around and and/or over said nut and against the puller bar to pull the puller bar and puller buddy in a direction away from the article to tension the studbolt.

17. (Currently amended) A nut assembly for use with an hydraulic tensioner for applying tension to a studbolt extending from an article, wherein the tensioner includes a puller bar for connection with an end of the studbolt, and an hydraulic means acting via a bridge between the puller bar and article to exert a pulling force on the studbolt in a direction away from 5 the article, said nut assembly comprising:

a nut body with a substantially conical or tapered peripheral outer surface;

an annular collar shell with a complementary conical or tapered recess to receive the nut body, in use;

the nut body being screwed, in use, on said studbolt and into the recess of the annular 10 collar, and adapted to be adjusted along said studbolt and against said collar to take up elongation of the studbolt as a result of applying tension to it shell.

18. (Currently amended) A washer for use between the nut and article in the tensioner as claimed in Claim 17 16, the washer comprising:

first and second annular means mating at a slip plane angled from a the plane transverse to the axis of the washer; and

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5 removable or releasable means holding the first and second annular means against relative slip over the slip plane therebetween while whilst the removable or releasable means is in place.

19. Cancelled

20. Cancelled

21. (Currently amended) A coupling for the hydraulic tensioner of the type as claimed in Claim 2 wherein:

the threaded end of the studbolt is an internal thread, and the threaded end of the puller bar is an external thread; and

the internal thread on the studbolt and the externally threaded end of the puller bar are tapered, and comprise buttress threads.

22. (Previously amended) A coupling for the hydraulic tensioner of the type as claimed in Claim 4 wherein:

the internal thread on the studbolt and the external thread on the end of the puller bar are buttress threads.

23 - 31. (Cancelled).

32. (Previously presented) A washer for use with the tensioner as claimed in Claim 8, said washer comprising:

a first and second annular means mating at a slip plane angled from the plane transverse to the axis of the washer; and

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5 removable or releasable means holding the first and second annular means against relative slip over the slip plane therebetween whilst the removable or releasable means is in place.

33. (Previously presented) A washer for use between the nut and article in the tensioner as claimed in Claim 9, said washer comprising:

a first and second annular means mating at a slip plane angled from the plane transverse to the axis of the washer; and

5 removable or releasable means holding the first and second annular means against relative slip over the slip plane therebetween whilst the removable or releasable means is in place.

34. Cancelled

35. (Currently amended) An hydraulic tensioner as claimed in claim 16 34, wherein:

the pitch of the external thread on the puller bar is greater than the pitch of the internal thread in the end of the studbolt.

36. (Previously presented) An hydraulic tensioner as claimed in claim 35, wherein:

the pitch of the external thread on the puller bar is 3.005 mm and the pitch of the thread in the end of the studbolt is 3.00 mm.

37. (New) A hydraulic tensioner as claimed in claim 1, wherein:
the bridge is engaged between the hydraulic means and the collar.